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<p>(54) Title: MILD SHAMPOO COMPOSITION</p> <p>(57) Abstract</p> <p>The present invention relates to a mild shampoo composition that is a low-irritant to the skin, hair and eyes. The shampoo composition comprises, per 100 parts by weight, from about 5 to about 50 parts of a sensitive surfactant mixture comprising (a) from about 10 to about 60 percent by weight of the mixture of at least one strong anionic surfactant, (b) from about 10 to about 40 percent by weight of the mixture of at least one amphoteric surfactant and (c) from about 10 to about 60 percent by weight of the mixture of at least one alkyl saccharide nonionic surfactant.</p>		

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MILD SHAMPOO COMPOSITION

BACKGROUND OF THE INVENTION

5 This invention relates to a shampoo composition, and in particular, to a hair or body shampoo composition with good cleansing performance that is also mild to the user's skin, hair and eyes and contains a sensitive surfactant mixture having at least one strong anionic surfactant, at least one amphoteric surfactant and at least one alkyl saccharide nonionic surfactant.

10 Anionic surfactants are a desirable component in shampoo compositions because of their good cleaning properties. A disadvantage of anionic surfactants, however, is that they are harsh. Thus, formulating a shampoo composition that is mild often involves compromising cleansing performance.

15 For example, United States Patent No. 5,221,530 issued to Janchitraponvej et al. describes a mild conditioning shampoo for hair. To provide a mild conditioning shampoo, Janchitraponvej et al. restrict the amount of anionic surfactants in the composition. Alternatively, Janchitraponvej et al. uses only "weaker and milder" anionic surfactants to achieve lower irritation. These low-irritation anionic surfactants include disodium salts of an ethoxylated lauryl alcohol
20 half ester of sulfosuccinic acid, disodium salts of substituted ethanolamide half esters of sulfosuccinic acid, carboxylic acids and carboxylate detergents. The use of such low-irritation anionic surfactants, however, may result in a loss of cleansing performance.

25 It has surprisingly been found that a mild shampoo composition that produces high foam stability and good cleansing performance can be obtained by including a sensitive surfactant mixture that includes a "strong" anionic surfactant,

at least one amphoteric surfactant and at least one alkyl saccharide nonionic surfactant.

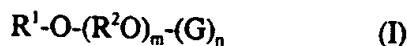
SUMMARY OF THE INVENTION

The present invention relates to a mild shampoo composition comprising, per 100 parts by weight, from about 5 to about 50 parts of a sensitive surfactant mixture comprising (a) from about 10 to about 60 percent by weight of the mixture of at least one strong anionic surfactant, (b) from about 10 to about 40 percent by weight of the mixture of at least one amphoteric surfactant and (c) from about 10 to about 60 percent by weight of the mixture of at least one alkyl saccharide nonionic surfactant. Preferably, the ratio of components (a) to (b) in the sensitive surfactant mixture is between about 1:1 and about 5:1. The preferred ratio of components (b) to (c) is between about 1:1 and about 1:4.

"Strong anionic surfactants" includes synthetic anionic surfactants containing phosphate, sulfate or sulfonate functional groups. The preferred strong anionic surfactant is a synthetic anionic surfactant selected from the group consisting of long chain (C_{10} to C_{22}) alkyl sulfates, long chain (C_{10} to C_{22}) alkyl sulfates, long chain (C_{10} to C_{22}) partially or fully ethoxylated alkyl sulfates, long chain (C_{10} to C_{22}) sulfonate and combinations thereof. More preferably, the anionic surfactant component of the shampoo composition is a combination of alkyl sulfates and alkyl ether sulfates.

Useful amphoteric surfactants include mono- and diacetates, betaines, imidazolines, glycinate, isothionates, mono- and dipropionates, hydroxy sultaines and taurates. The preferred amphoteric surfactants are glycinate.

The alkyl saccharide nonionic surfactant is an aliphatic alkyl saccharide represented by formula (I):



wherein R^1 represents a linear or branched alkyl group containing from about 8 to about 22 carbon atoms, a linear or branched alkenyl group containing from about 8 to about 22 carbon atoms, or an alkylphenyl group containing from about 8 to about 22 carbon atoms, with the alkyl group being either linear or branched, R^2 represents an alkylene group containing from 2 to 4 carbon atoms, and G

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represents a reduced sugar containing from 5 to 6 carbon atoms, m denotes a value of 0 to 10 and n denotes a value from about 1 to about 10. A preferred alkyl saccharide nonionic surfactant is decyl polyglucoside, wherein R¹ is a saturated alkyl group containing 10 carbon atoms, G is a glucose unit, m has a value of 0 and n has a value of about 1.5.

The shampoo composition may also contain up to about 10 parts of conventional additives.

Unexpectedly, it has been found that shampoo compositions that incorporate the sensitive surfactant mixture of the present invention produces exceptional mildness as well as superior cleansing performance and high foam stability compared to commonly used mild shampoo compositions.

It is noted that, unless otherwise stated, all percentages given in this specification and the appended claims refer to percentages by weight of the total composition.

These and other objects, advantages, and features of the present invention will be better understood upon review of the following detailed description of the preferred embodiments.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention relates to a mild shampoo composition comprising, per 100 parts by weight, from about 5 to about 50 parts of a sensitive surfactant mixture comprising (a) from about 10 to about 60 percent by weight of the mixture of at least one strong anionic surfactant, (b) from about 10 to about 40 percent by weight of the mixture of at least one amphoteric surfactant and (c) from about 10 to about 60 percent by weight of the mixture of at least one alkyl saccharide nonionic surfactant. The shampoo composition can be used as a hair or body shampoo that is sensitive to the hair and skin. In a preferred embodiment, the shampoo composition does not cause irritation to mucous membranes such as the eye.

Anionic surfactants are included to provide cleansing performance and a high foam level that is desirable to consumers. Generally, anionic cleansing surfactants include a hydrophobic moiety, such as a carbon chain including from about 8 carbon atoms to about 30 carbon atoms, and particularly from about 12

carbon atoms to about 22 carbon atoms and further includes a hydrophilic moiety.

The term "strong anionic surfactant" includes the anionic surfactants having a hydrophilic moiety such as sulfate, sulfonate, or phosphate. Often, the hydrophobic carbon chain is esterified, such as with ethylene oxide or propylene oxide, to impart a particular physical property, such as increased water-solubility or reduced surface tension, to the anionic cleansing agent.

Anionic surfactants particularly useful in the present invention include strong anionic surfactants containing at least one sulfur group. Thus, for example, the anionic surfactant useful in the present invention includes sulfated and sulfonated anionic surfactants. Useful sulfated anionic surfactants include but are not limited to primary and secondary alkyl sulfates, primary and secondary sulfates of ethoxylated alcohols and sulfates of fatty esters. Useful sulfonated anionic surfactants include but are not limited to sulfonates of alkylbenzene, sulfonates of dodecyl benzene, sulfonates of tridecylbenzene, primary and secondary alkyl sulfonates, alpha olefin sulfonates, sulfonates of naphthalene and alkyl naphthalene, sulfonates of petroleum and combinations thereof. Specific examples of strong anionic surfactants useful in the present invention include but are not limited to those that are listed in McCutcheon's Emulsifiers & Detergents, Annual 1992 and in Janchitraponvej et al., the relevant portions of both are incorporated herein by reference.

Preferred strong anionic surfactants of the present invention include alkyl sulfates and ether sulfates. Alkyl sulfates include, for example, sulfates derived from natural alcohols having from 8 to 22 carbon atoms. Thus, alkyl sulfates include, for example, sodium lauryl sulfates, ammonium lauryl sulfates, sodium myristyl sulfates, and ammonium myristyl sulfates. Ether sulfates include, for example, the alkyl ether sulfates such as polyoxyethylene alkyl ether sulfates and tridecyl ether sulfates, alkyl ether sulfates derived from natural alcohol such as sodium lauryl alcohol polyglycol ether sulfates and fatty alcohol ether sulfates, alkyl ether sulfates derived from synthetic alcohol, and ether sulfates derived from aliphatic carboxylic acids such as sodium lauryl ether sulfates, sodium myristyl ether sulfates, polyoxyethylene lauryl ether sulfates, triethanolamine lauryl ether sulfates and ammonium lauryl ether sulfates. Particular examples of these strong

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anionic surfactants include but are not limited to those that can be found in McCutcheon's.

5 In a preferred embodiment of the invention, the strong anionic surfactant is selected from the group consisting of long-chain alkyl sulfates, long-chain alkyl sulfonates, long-chain partially or fully ethoxylated alkyl sulfates, long-chain sulfonate and combinations thereof. The term "long-chain" refers to alkyl chains containing from 10 to 22 carbon atoms.

10 A preferred embodiment includes a strong anionic surfactant that is a combination of long-chain alkyl sulfates and long-chain partially or fully ethoxylated alkyl sulfates. Preferably, the amount of long-chain ethoxylated alkyl sulfates is greater than that of the long-chain alkyl sulfates. More preferably, the amount of long-chain ethoxylated alkyl sulfates is present at a level from about 60 to about 80 percent of the total strong anionic surfactant component. Preferably, the ethoxylated alkyl sulfates are included at a level of from about 10 to about 30 percent of the sensitive surfactant mixture.

15 The amount of strong anionic surfactant component is included in an amount from about 1 to about 15 percent of the total shampoo composition. Preferably, the strong anionic surfactant is included in an amount of from about 3 to about 7.5 percent of the total shampoo composition. The more preferred amount of strong anionic surfactants is from about 3.5 to about 5 percent of the total shampoo composition.

20 Amphoteric surfactants are provided in the shampoo composition as a co-surfactant to improve cleansing performance while at the same time contribute to the mildness of the shampoo composition. Amphoteric surfactants characteristically contain both basic and acidic functional groups. In acidic environments, amphoteric surfactants become protonated, thereby acquire positive charge. In alkaline environments they lose a proton and have a net negative charge. Examples of amphoteric surfactants useful in the present invention include, but are not limited to, mono- and diacetates, betaines, imidazolines, glycinates, isothionates, mono- and dipropionates, hydroxy sultaines, taurates, and combinations thereof. Particular examples of amphoteric surfactants include but are not limited to those that can be found in McCutcheon's, the relevant

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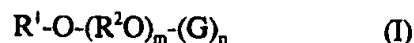
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portions are incorporated herein by reference.

The preferred amphoteric surfactant are glycines. Glycines are acyl derivatives of ethylenediamines and salts thereof. These compounds are also classified as imidazoline derivatives. This category of amphoteric surfactant includes monocarboxylates, dicarboxylates and sulfonates, where the structural distinction is primarily in the fatty side chain. Particular examples of glycines include, but are not limited to, cocoamphocarboxyglycinate, cocoamphoglycinate, lauroamphocarboxyglycinate, lauroamphoglycinate and salts thereof.

The amphoteric surfactant component is included in an amount from about 1 to about 15 percent of the total shampoo composition. Preferably, the amphoteric surfactant component is included in an amount of from about 1.5 to about 5 percent of the total shampoo composition. The more preferred amount of amphoteric surfactant component is from about 2 to about 4 percent of the total shampoo composition.

The nonionic surfactants useful in the present invention include aliphatic saccharide nonionic surfactants represented by formula (I):



wherein R^1 represents a linear or branched alkyl group containing from about 8 to about 22 carbon atoms, a linear or branched alkenyl group containing from about 8 to about 22 carbon atoms, or an alkylphenyl group containing from about 8 to about 22 carbon atoms, with the alkyl group being either linear or branched; R^2 represents an alkylene group containing from 2 to 4 carbon atoms; G represents a reduced sugar containing from 5 to 6 carbon atoms; m denotes a value of 0 to about 10 and n denotes a value from about 1 to about 10. It should be understood that n is the average number of reduced sugar units G per R^1 group. Preferably, R^1 contains from about 8 to about 18 carbon atoms. In a preferred embodiment, R^1 is an unbranched alkyl group having from about 8 to about 18 carbon atoms; m denotes a value of 0 and n denotes a value from about 1 to about 2. Glucose is the preferred reduced sugar unit G . The preferred aliphatic saccharide surfactant has a degree of polymerization from about 1 to about 2 and a free fatty alcohol content of less than about 5 %.

Like the amphoteric surfactants, the aliphatic saccharide nonionic

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surfactants are provided in the shampoo composition as a co-surfactant to improve the cleansing performance while at the same time contribute to the mildness of the shampoo composition. In addition, aliphatic saccharide surfactants also contribute to foam stability.

5 The aliphatic saccharide nonionic surfactant component is included in an amount from about 1 to about 15 percent of the total shampoo composition. Preferably, the aliphatic saccharide nonionic surfactant component is included in an amount of from about 1.5 to about 10 percent of the total shampoo composition. The more preferred amount of aliphatic saccharide nonionic
10 surfactant component is from about about 2 to about 7.5 percent, of the total shampoo composition.

 The sensitive surfactant mixture containing the described strong anionic, amphoteric and aliphatic saccharide nonionic surfactants is preferably included in the shampoo composition at a level of from about 5 to about 25
15 percent, preferably from about 8 to about 15 percent.

 In a preferred embodiment of the invention, the ratio from the amount of anionic surfactant to the amount of amphoteric surfactant is between about 1:1 and about 6:1, preferably between about 1:1 and about 5:1, more preferably between about 1.5:1 and about 4:1. The ratio between the amount of
20 amphoteric surfactant to the amount of aliphatic saccharide nonionic surfactant is between about 1:1 and about 1:6, preferably between about 1:1 and about 1:4, more preferably between about 1:1.5 and about 1:3.

 The present invention may also contain other nonionic surfactants commonly used in shampoo compositions, such as, for example, alkanolamides, amine oxides, alkoxylated alcohols and phenols, block polymers, alkoxylated
25 amines and combinations thereof, so long as they do not detract from the advantageous features of mildness and improved cleansing performance of the present invention.

 The shampoo composition can contain up to about 10 percent of the optional ingredients generally described below.
30

 The present invention may contain optional ingredients such as alkalinity sources, acidifying agents, pH buffering agents, and pH control agents.

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Examples of acidifying agents include but are not limited to citric acid, acetic acid, benzoic acid, phenol and palmitic acid. Examples of pH control agents include but are not limited to alkali metal carbonates and bicarbonates, monoethanolamine, triethanolamine, tris hydroxy methylamine, ammonium hydroxide, alkaline metal earths, and alkali metal hydroxides. Citric acid is preferred and can be added up to a level of about 5%.

Sequestrants can also be incorporated into the composition. Examples of sequestrants include but are not limited to the alkali metal polycarboxylates, such as sodium and potassium citrate, sodium and potassium tartrate, citric acid, sodium and potassium ethylenediaminetetraacetate (EDTA), triacetates, sodium and potassium nitrilotriacetates (NTA), and mixtures thereof. Up to about 5% of sequestrants can be used.

The shampoo composition of the present invention may also include common optional ingredients for shampoo compositions such as humectants (such as propylene glycol, glycerin, sorbitol, and the like); viscosity adjusting agents (such as carboxyvinyl polymer, methyl cellulose, hydroxyethyl cellulose, polyoxyethyleneglycol distearate, ethanol, and the like); opacifiers; pearlescing agents; perfumes; dyes; pigments; ultraviolet ray absorbers; antioxidants; biocidal agents (such as Trichlosan, Trichlorocarbon and the like); antiphlogistic agents (such as potassium glycol phosphate, tocopherol acetate and the like); anti-dandruff agents (such as zinc pyrithione, Octopirox and the like); antiseptics (such as methyl paraben, butyl paraben and the like); preservatives and the like may be optionally formulated into the shampoo composition inasmuch as the effect of the present invention is not affected. These additives are preferably present in the composition in combined amounts of less than 5% and in individual amounts of less than 2% each.

In a preferred embodiment of the present invention, the shampoo composition is a neutral to slightly acidic composition and has a pH of between about 5 and about 7, preferably between about 5.8 and about 6.9.

The shampoo composition of the present invention can be relatively viscous dispersions that are stable to phase separation at a temperature of from about 20° C. to about 25° C. for a period of time of at least 24 hours after

preparation, and typically are stable to phase separation indefinitely at such temperatures. The compositions of the present invention usually are emulsions that are stable to phase separation at a temperature of about 25° C. for a period of about 24 hours after preparation. The emulsions should demonstrate sufficient stability to phase separation at temperatures normally found in commercial product storage and shipping to remain unaffected for period of one year or more. The shampoo composition preferably has a viscosity value of between about 3,000 and about 10,000 centipoise at 25° C.

The balance of the composition of the shampoo composition of the present invention comprises water. In general, any type of water can be used in the composition, although good manufacturing procedures usually dictate that the water be deionized and substantially free of major contaminants and impurities. It is understood that the amount of water can be varied depending upon the desired concentration of the final product.

The shampoo composition of the present invention has been found to exhibit high levels of foam while at the same time exhibit mildness to the hair and skin. In addition, the shampoo composition has been found to be a low-irritant to the eye so as to not cause tears.

The following nonlimiting examples are given to illustrate the compositions and the advantages of the invention.

EXAMPLE 1

Table I illustrates sixty shampoo formulations. The formulations contained a citric acid premix and a sodium chloride premix, meaning that the components in the premix were combined to form an aqueous solution prior to addition to the formulation.

Each shampoo formulation was evaluated *in vitro* to assess and compare their irritation potentials in the following manner. An amount of each formulation was applied to a tissue substrate, which was placed in a Skin² ZK1000 model, obtained from Advanced Tissue Sciences. The Skin² ZK1000 model consists of normal dividing, metabolically active fibroblasts. These fibroblasts were exposed to each formulation for a period of from about 16 to about 24 hours.

An MTT assay was conducted to measure the cytotoxicity. An MTT_{50} value was determined for each formulation. MTT_{50} measures the concentration of test material that causes 50% cell death in the tissue substrates when compared with untreated controls. A shampoo formulation having a MTT_{50} value of above 800 $\mu\text{g/mL}$ is considered mild enough to be classified as a "baby" shampoo. The results are shown in Table II.

The foam volume of each formulation was also measured. Foam volume reflects the cleansing performance of the formulations. A formulation is considered to have a good or acceptable foam level when its foam volume is above 120 milliliters (mL). The results are also shown in Table II.

Table I

COMPONENT	DESCRIPTION OF COMPONENT	COMPOSITION (% by wt.)					
		A	B	C	D	E	F
Water	Purified Water	54.96	51.82	48.68	54.02	50.18	54.95
Texapon EA-1 ¹	Anionic Surfactant Blend (25.9% active) 30 % by wt. dodecyl ammonium sulfate, 70 % by wt. ammonium laureth sulfate (average 1 mole of EO)	14.29	21.43	28.57	18.93	28.57	14.29
Mackam 2C ²	Cocampho carboxyglycinate (50% active)	15.00	15.00	15.00	8.50	7.50	15.00
Planaren 2000 ¹	Decyl polyglucoside (50% active)	12.00	8.00	4.00	14.80	10.00	12.00
PEG-150 stearate	n/a	1.50	1.50	1.50	1.50	1.50	1.50
Citric Acid Premix	50 % by wt. citric acid, 50 % by wt. purified water	0.40	0.40	0.40	0.40	0.40	0.40
Jaguar C162 ³	Quaternized Guar Gum	0.30	0.30	0.30	0.30	0.30	0.30
Terrasodium EDTA	n/a	0.10	0.10	0.10	0.10	0.10	0.10
Kathon CG ⁴	Methylchloroisothiazolinone and Methylisothiazolinone	0.05	0.05	0.05	0.05	0.05	0.05
Acetamide MEA	n/a	1.00	1.00	1.00	1.00	1.00	1.00
Sodium Chloride Premix	16.7 % by wt. sodium chloride, 83.3 % by wt. purified water	0.40	0.40	0.40	0.40	0.40	0.40

¹ Obtained from Henkel Corporation.² Obtained from McIntyre Group, Ltd.³ Obtained from Rhone-Poulenc Surfactants and Specialties.⁴ Obtained from Rohm and Haas France S.A.

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Table II

FORMULATION	FOAM VOLUME (mL)	MILDNESS RATING (μ g/ml)
A	155	811
B	150	890
C	220	747
D	150	756
E	175	735
F	140	911

5 As shown in Table II, all of the formulations unexpectedly produced high foam and acceptable mildness. Moreover, Formulations A, B and F were mild enough to be classified as baby shampoos.

EXAMPLE 2

A shampoo formulation is illustrated in Table III.

10 This formulation was clinically evaluated for dermal irritation. The human subjects included 47 female adults (20-44 years age range) and 47 male and female children (6 months to two years age range). Of the 47 female adults, 21 subjects had self-assessed "sensitive" skin. Each of the adult subjects were instructed to apply a small amount of the shampoo formulation to the arms, underarms and legs at least once a day for a period of four weeks. During the same period of time, it was instructed that a small amount of the shampoo
15 formulation be applied to the scalp, body and diaper area of the children.

Table III

COMPONENT	DESCRIPTION OF COMPONENT	COMPOSITION (% by wt.)
Water	Purified Water	60.68
Texapon EA-1 ¹	Anionic Surfactant Blend (25.9% active) 30 % by wt. dodecyl ammonium sulfate, 70 % by wt. ammonium laureth sulfate (average 1 mole of EO)	14.40
Mirapon Excel 825 ²	sodium cocoamphoacetate ⁵ (25% active)	9.76
Plantaren 2000 ¹	Decyl polyglucoside (50% active)	9.21
Sodium Chloride Premix	16.7 % by wt. sodium chloride, 83.3 % by wt. purified water	1.80
Acetamide MEA	n/a	1.50
PEG-100 methyl glucose dioleate	n/a	1.00
Citric Acid Premix	50 % by wt. citric acid, 50 % by wt. purified water	0.70
Dipropylene glycol isoceteth-20 acetate	n/a	0.50
Polymer JR-400 ³	Polyquaternium-10	0.30
Tetrasodium EDTA	n/a	0.10
Kathon CG ⁴	Methylchloroisothiazolinone and Methylisothiazolinone	0.05

¹ Obtained from Henkel Corporation.

² Obtained from Rhone-Poulenc Surfactants and Specialties.

³ Obtained from Amerchol Corp.

⁴ Obtained from Rohm and Haas France S.A.

⁵ A sodium salt of cocoamphoglycinate.

Following the four-week use period, no clinically significant dermal irritation resulted in any of the 47 adults or 47 children.

Therefore, the most preferred shampoo composition consists essentially of, per 100 parts, (a) from about 1 to about 15 parts of a strong anionic surfactant that is a combination of at least one long-chain alkyl sulfate such as ammonium lauryl sulfate and at least one long-chain ethoxylated alkyl sulfate such as ammonium lauryl sulfate; (b) from about 1 to about 15 parts of at least one amphoteric surfactant such as cocoamphocarboxyglycinate, cocoamphoglycinate, lauroamphocarboxyglycinate, lauroamphoglycinate, salts thereof and combinations

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thereof; (c) from about 1 to about 15 parts of decyl polyglucoside containing an average of about 1.5 glucose units per fatty alkyl group, an average degree of polymerization of from about 1 to about 2 and less than about 1 percent free fatty alcohol content; (d) up to about 10 parts of additives; and (e) water comprising the balance.

Of course, it should be understood that a wide range of changes and modifications can be made to the embodiments described above. It is therefore intended that the foregoing description illustrates rather than limits this invention, and that it is the following claims, including all equivalents, which define this invention.

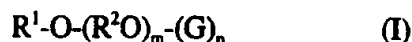
WHAT IS CLAIMED IS:

1. A mild shampoo composition comprising, per 100 parts by weight:
 - a. from about 5 to about 50 parts of a sensitive surfactant mixture comprising:
 - 5 (a) from about 10 to about 60 percent by weight of the mixture of at least one strong anionic surfactant;
 - (b) from about 10 to about 40 percent by weight of the mixture of at least one amphoteric surfactant;
 - (c) from about 10 to about 60 percent by weight of the mixture of at least one aliphatic saccharide nonionic surfactant;
 - 10 b. up to about 10 parts of additives; and
 - c. water comprising the balance;wherein the ratio of components (a) to (b) is between about 1:1 and about 6:1 and the ratio of components (b) to (c) is between about 1:1 and about 1:6.
- 15 2. The composition of claim 1 wherein the strong anionic surfactant is a synthetic anionic surfactant selected from the group consisting of long-chain alkyl sulfates, long-chain alkyl sulfonates, long-chain partially or fully ethoxylated alkyl sulfates and combinations thereof.
- 20 3. The composition of any one or both of claim 1 and 2 wherein the strong anionic surfactant is a mixture of at least one long-chain alkyl sulfate and at least one long-chain ethoxylated alkyl sulfate.
- 25 4. The composition of claim 3 wherein the ethoxylated alkyl sulfate is present in an amount of from about 60 to about 80 percent of the strong anionic surfactant.
- 30 5. The composition of any one or both of claim 1 and 2 wherein the amphoteric surfactant is selected from the group consisting of monoacetates, diacetates, betaines, imidazolines, glycines, isothionates, monoproprionates, diproprionates, hydroxy sultaines, taurates and combinations thereof.

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6. The composition of any one or both of claim 1 and 2 wherein the amphoteric surfactant is a glycinate.

7. The composition of any one or both of claim 1 and 2 wherein the aliphatic saccharide nonionic surfactant is represented by formula (I):



wherein R^1 represents a linear or branched alkyl group containing from about 8 to about 22 carbon atoms, a linear or branched alkenyl group containing from about 8 to about 22 carbon atoms, or an alkylphenyl group containing from about 8 to about 22 carbon atoms, with the alkyl group being either linear or branched, R^2 represents an alkylene group containing from 2 to 4 carbon atoms, and G represents a reduced sugar containing from 5 to 6 carbon atoms, m denotes a value of 0 to 10 and n denotes a value from about 1 to about 10.

8. The composition of claim 7 wherein the R^1 represents a unbranched alkyl group containing from about 8 to about 18 carbon atoms, m denotes a value of 0, n denotes a value of from about 1 to about 2 and G represents glucose.

9. A mild shampoo composition comprising, per 100 parts by weight:

- from about 1 to about 15 parts of at least one strong anionic surfactant;
- from about 1 to about 15 parts of at least one amphoteric surfactant;
- from about 1 to about 15 parts of at least one aliphatic saccharide nonionic surfactant;
- up to about 10 parts of additives; and
- water comprising the balance.

10. The composition of claim 9 wherein the strong anionic surfactant is a synthetic anionic surfactant selected from the group consisting of long-chain alkyl sulfates, long-chain alkyl sulfonates, long-chain partially or fully ethoxylated alkyl sulfates and combinations thereof.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US97/00742

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :A61K 7/07

US CL :424/70.19

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 424/70.19

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y, P	US 5,554,313 A (CHANDLER) 10 September 1996, column 2-5	1, 2, 9, 10
Y, P	US 5,534,248 (MATSUO et al) 09 July 1996, column 5-13.	1, 2, 9, 10
Y	US 5,372,744 A (KAMEGAI et al) 13 December 1994, column 2-4.	1, 2, 9, 10



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	*T	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X*	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y*	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A*	document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means		
P document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

17 APRIL 1997

Date of mailing of the international search report

14 MAY 1997

Name and mailing address of the ISA/US
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US97/00742

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☒ Claims Nos.: 3-8
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐

The additional search fees were accompanied by the applicant's protest.

☐

No protest accompanied the payment of additional search fees.